

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE <div style="text-align: center;">J</div>		PAGE OF PAGES <div style="text-align: center;">1 5</div>	
2. AMENDMENT/MODIFICATION NO. <div style="text-align: center;">0002</div>		3. EFFECTIVE DATE <div style="text-align: center;">26-Aug-2004</div>		4. REQUISITION/PURCHASE REQ. NO. <div style="text-align: center;">W26GLG-4128-1334</div>		5. PROJECT NO.(If applicable)	
6. ISSUED BY USA ENGINEER DISTRICT, NORFOLK CONTRACTING OFFICE 803 FRONT STREET NORFOLK VA 23510-1096		CODE <div style="text-align: center;">W91236</div>		7. ADMINISTERED BY (If other than item 6) <div style="text-align: center;">See Item 6</div>			
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)				X 9A. AMENDMENT OF SOLICITATION NO. W91236-04-R-0027			
				X 9B. DATED (SEE ITEM 11) 29-Jul-2004			
				10A. MOD. OF CONTRACT/ORDER NO.			
				10B. DATED (SEE ITEM 13)			
CODE		FACILITY CODE					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)							
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.							
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).							
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:							
D. OTHER (Specify type of modification and authority)							
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) AMENDMENT NO. 0002 to W91236-04-R-0027, Surge Tank, Radford Army Ammunition Plant, Radford, VA. See continuation pages.							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				TEL: _____ EMAIL: _____			
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)		16C. DATE SIGNED 26-Aug-2004	

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been added by full text:

AMEND 0002 CONTINUATION PAGE

AMENDMENT 0002 TO W91236-04-R-0027, Surge Tank, Radford Army Ammunition Plant, Radford, VA

1. **Reference SF 1442**, Block 11 and **Section 00800**, Clause 52.211-10

Delete 30 calendar days and **replace with** 10 calendar days and **Delete** 270 days and **replace** with 400 calendar days.

2. **Section 00100** – Bidding Schedule/Instructions to Bidders.

a. Delete and replace with the attached Additional Requirements.

b. Reference 52.235-27: Contractors need to provide 24 hour notice to POC: Mr. Guy Rhodes at (540) 639-7656 to schedule site visit.

3. **Section 00600:**

- i. Delete the following clauses:
52.219-9-1
252.236-7010

4. **Technical Specifications** are hereby modified in accordance with the attached pages.

a. Delete Section 05093 in its' entirety and replace with the attached Section 05093.

Provided with this amendment:

1. Revised "Additional Requirements"
2. Electrical site work Scope of Work (1 page text and 1 sketch)
3. Revised Spec Section 05093

ADDITIONAL REQUIREMENTS

CONTRACTOR PERFORMANCE AND BANKING INFORMATION

The following information shall be submitted along with the proposal.

A. Experience and Past Performance: Provide the following information (in the order given) for each qualifying project which you intend to demonstrate the minimum acceptable experience described in "Minimum acceptable relevant experience".

- Project Title
- Project Location
- Owner Name, Current Phone & Fax Number, Current Address
- Owner On site Representative Name, Current Phone Number, Current Address
- Contract Completion Date at Award
- Actual Completion Date
- Contract Price at Completion
- Brief scope of work (not more than one page) to demonstrate at least the experience described under Minimum acceptable relevant experience.

B. Minimum Acceptable Relevant Experience:

1. A minimum of three completed construction contracts with the US Army, US Navy, US Air Force, or US Marine Corps in the continental United States within the last five years with a value of at least \$1,000,000 each.
2. A minimum of one construction contract, at least 50% complete to build steel-reinforced, cast-in-place concrete tank to meet ACI 350R and connection to existing industrial waste with a minimum contract price of \$500,000 in the continental United States within the last three years. Owner may be an US Government, State, municipal or private owner.

Notes:

1. Contracts with other Government Agencies do not qualify except as otherwise noted.

2. Contract 50% complete is defined as (1) contract signed by all parties, and (2) contract price determined, and (3) payments by owner or owner representative total at least 50% of contract price, and (4) on site work under way.
3. Contracts at private, municipal or other Government industrial facilities, do not qualify, except as otherwise noted.
4. Lengthy submittals are not desired. Color photography or other expensive reproduction is not necessary.
5. Contract completion is defined as final payment made and accepted and all claims settled.
6. It is the contractor's responsibility to provide information sufficient enough to be verified.

C. Banking Information

The required banking information must include the following:

- Name and address of Bank
- Point of contact and phone/fax number
- Account number

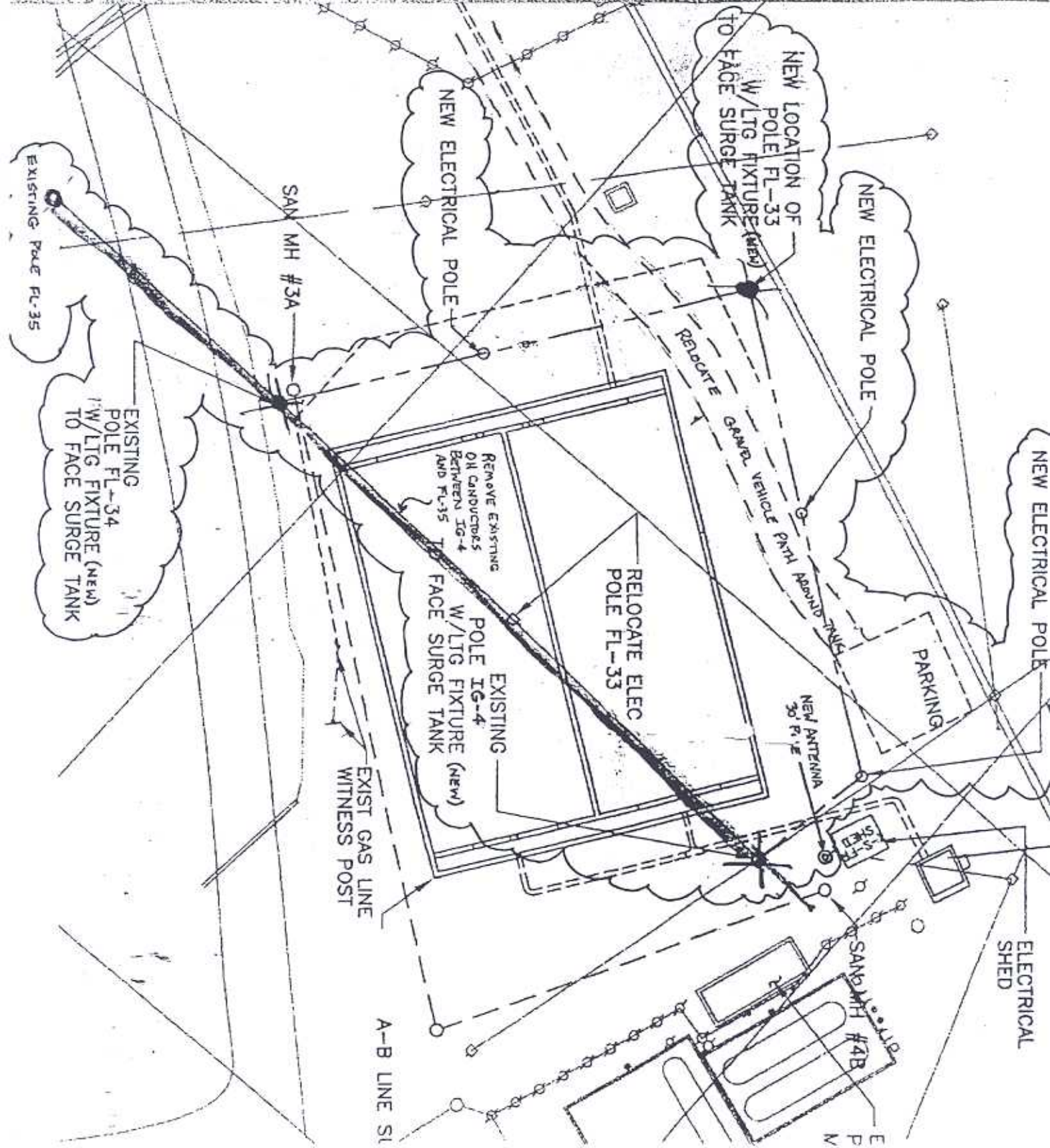
BASIS OF AWARD:

1. All blanks must be filled in by the offeror.
2. A single award will be made.
3. Award will be made to the lowest price offer received from a responsible, responsive offeror who is technically acceptable.
4. Technical acceptability will be shown as "GO" OR " NO GO". In order to be determined technically acceptable, the reference projects shall meet or exceed all conditions as listed.
5. Proposals shall be ranked according to price. Technical proposal of the lowest priced offer will be evaluated. Award will be made to that offeror if the technical proposal is evaluated as GO. If the technical proposal is evaluated as "NO GO", the next low proposal will be evaluated and so on until a technically acceptable offer is found.
6. Prior to making award, a pre-award survey will be done and the technically acceptable low offeror will be required to show that they have the necessary capital, experience and owns or can procure the necessary equipment to commence work in accordance with the specifications and complete the work safely and satisfactorily within the time specified.

ELECTRICAL SITE WORK SCOPE OF WORK

1. Reference sketch SK-E1001 dated 26 April 2004.
2. RFAAP (ATK) to de-energize 2300V FL circuit by cutting jumpers between upper and lower cross arms on pole IG-4.
3. The contractor shall remove existing overhead conductors (two) from pole IG-4 to pole FL-35 and relocate existing wooden pole FL-33 as indicated on sketch SK-E1001 dated 26 April 2004. Actual relocation of pole FL-33 shall be coordinated in the field with government personnel.
4. The contractor shall furnish and install three (3) new 35' Class A poles as indicated on sketch SK-E1001 dated 26 April 2004. Actual location of all poles to be coordinated in the field with government personnel.
5. The contractor shall be responsible for any necessary guy wires & bracing of each pole installed to balance the loads on the pole. Installation and support of poles shall be in accordance with applicable standards. Provide new caps at poles to match existing caps.
6. The contractor shall furnish and install three (3) new lighting fixtures, one at each existing pole IG-4, pole FL-34 and relocated pole FL-33. Each lighting fixture shall be a 400W floodlight high pressure sodium (HPS) with photocell, shall match the type and voltage rating of existing fixture (to remain) at pole IG-4, and shall be installed to face towards the tank area. An acceptable lighting fixture would be Hubbell Miniliter, Cat # MHS-400S-468, with photocell, IES/NEMA Type 7Hx6V, or equal.
7. The contractor shall install #6 AWG triplex overhead secondary FL circuit originating at pole IG-4 along route shown, and terminating at existing pole FL-34. The contractor shall modify the existing wiring to the new lighting fixtures, consistent with the existing installation. The contractor shall utilize power from existing lighting controller.
8. The contractor shall actually install the new 30' utility pole for the radio antenna shown on contract drawing EH001 to be installed by others. Install the new pole near the electrical shed (Bldg #471). Coordinate actual location in the field with government personnel.
9. ATK will de-energize secondary FL circuit at pole IG-4 for final tie-in of new circuit by the contractor.
10. ATK will install new secondary feed to existing FL circuit at terminal end (near storage tanks) of 2300V line.
11. Relocate the gravel vehicle path around the new surge tank beyond the new parking area as indicated. Coordinate new routing with government personnel and around new pole locations.

(End of Summary of Changes)



SECTION 05093

WELDING PRESSURE PIPING AND ACID PIPING
09/98

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ASNT RP SNT-TC-1A	(1996) Recommended Practice SNT-TC-1A
ASNT RP SNT-TC-1A Bk B	(1994) Question and Answers Levels I, II, and III Magnetic Particle Method Book B (Supplement to RP SNT-TC-1A)

ASME INTERNATIONAL (ASME)

ASME B31.1	(1998) Power Piping
ASME B31.3	(1999) Process Piping
ASME B31.4	(1992; B31.4a) Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols
ASME B31.5	(1992; B31.5a) Refrigeration Piping
ASME B31.8	(1995) Gas Transmission and Distribution Piping Systems
ASME BPVC SEC I	(1998) Boiler and Pressure Vessel Code; Section I, Power Boilers
ASME BPVC SEC II-C	(1998) Boiler and Pressure Vessel Code; Section II, Materials, Part C - Specifications for Welding Rods, Electrodes and Filler Metals
ASME BPVC SEC V	(1998) Boiler and Pressure Vessel Code; Section V, Nondestructive Examination
ASME BPVC SEC IX	(1998) Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(1998) Structural Welding Code - Steel
AWS D1.6	(1998) Structural Welding Code - Stainless

Steel

AWS D10.4	(1986) Recommended Practice for Welding Austenitic Chromium-Nickel Stainless Steel Piping and Tubing
AWS D10.8	(1996) Recommended Practice for Welding of Chromium-Molybdenum Steel Piping and Tubing
AWS D18.1	(1999) Specification for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications
AWS A2.4	(1998) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS A3.0	(1994) Standard Welding Terms and Definitions
AWS B2.1	(1998) Welding Procedure and Performance Qualification
AWS QC1	(1996) AWS Certification of Welding Inspectors
AWS Z49.1	(1999) Safety in Welding and Cutting and Allied Processes

1.2 DEFINITIONS

Definitions shall be in accordance with AWS A3.0.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Pressure and Acid Piping; G,
Detail drawings showing location, length, and type of welds; and
indicating postweld heat treatment and NDE as required.

SD-03 Product Data

Qualifications; G,
Welding procedure qualification.

Welding Operations; ,
Detailed procedures which define methods of compliance to contract
drawings and specifications. Inspection and material procurement
records. System and material testing and certification records.
Written records and drawings indicating location of welds made by
each welder or welding operator.

SD-07 Certificates

Qualifications; G,
Welder and welding operator performance qualification
certificates. Welding inspectors and NDE personnel certificates.
Qualifications of testing laboratory or the Contractor's quality
assurance organization.

1.4 GENERAL REQUIREMENTS

This section covers the welding of pressure piping and acid piping systems. Deviations from applicable codes, approved procedures, and approved detail drawings will not be permitted without prior written approval. Materials or components with welds made offsite will not be accepted if the welding does not conform to the requirements of this specification, unless otherwise specified. Procedures shall be developed by the Contractor for welding all metals included in the work and submitted for Government approval. Welding shall not be started until welding procedures, welders, and welding operators have been qualified. Qualification testing shall be performed by an approved testing laboratory. Costs of such testing shall be borne by the Contractor. The Contracting Officer shall be notified at least 24 hours in advance of the time and place of the tests. When practicable, the qualification tests shall be performed at or near the worksite. The Contractor shall maintain current records of the test results obtained in the welding procedure, welding operator, welder performance qualifications, and nondestructive examination (NDE) procedures readily available at the site for examination by the Contracting Officer. The procedures for making transition welds between different materials or between plates or pipes of different wall thicknesses shall be qualified. ASME B31.1, ASME B31.3, ASME B31.4, ASME B31.5, ASME B31.8 requirements for branch connections may be used in lieu of detailed designs. Unless otherwise specified, all pipe welding shall be accomplished using the GTAW welding process. All Stainless steel pipe welds shall conform to the requirements of AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1 as applicable. All ferrous steel pipe welds shall conform to the applicable requirements of AWS D1.1/D1.1M. In all instances, these references shall be applied as applicable to the base material being welded.

1.5 PERFORMANCE

The Contractor shall be responsible for the quality of all joint preparation, welding, and examination. All materials used in the welding operations shall be clearly identified and recorded. The inspection and testing defined in this specification are minimum requirements. Additional inspection and testing shall be the responsibility of the Contractor when he deems it necessary to achieve the quality required.

1.6 QUALIFICATIONS

Welding procedures, welders, and welding operators previously qualified by test may be accepted for the work without requalification, provided that all of the following conditions are fulfilled:

- a. Copies of the welding procedures, the procedure qualification test records, and the welder and welding operator performance qualification test records are submitted and approved in accordance with paragraph SUBMITTALS.
- b. Testing was performed by an approved testing laboratory or technical consultant or by the Contractor's approved quality

assurance organization.

- c. The welding procedures, welders, and welding operators were qualified in accordance with ASME BPVC SEC IX, or AWS B2.1, AR-2 level; and base materials, filler materials, electrodes, equipment, and processes conformed to the applicable requirements of this specification.
- d. The requirements of paragraph "Renewal of Qualification" below are met and records showing name of employer and period of employment using the process for which qualified are submitted as evidence of conformance.

1.6.1 Welding Procedures Qualification

The Contractor shall record in detail and shall qualify the Welding Procedure Specifications for every proposed welding procedure. Qualification for each welding procedure shall conform to the requirements of AWS D1.1/D1.1M AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1 and to this specification. Only full penetration welds butt welds using consumable inserts shall be allowed for pipe welds. The welding procedures shall specify end preparation for butt welds including cleaning, alignment, and root openings. Preheat, interpass temperature control, and postheat treatment of welds shall be as required by approved welding procedures, unless otherwise indicated or specified. Copies of the welding procedure specifications and procedure qualification test results for each type of welding required shall be submitted in accordance with paragraph SUBMITTALS. Approval of any procedure does not relieve the Contractor of the sole responsibility for producing acceptable welds. Welding procedures shall be identified individually and shall be referenced on the detail drawings or keyed to the contract drawings.

1.6.2 Welder and Welding Operator Performance

Each welder and welding operator assigned to work shall be qualified in accordance with AWS D1.1/D1.1M AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1.

1.6.2.1 Certification

Before assigning welders or welding operators to the work, the Contractor shall provide the Contracting Officer with their names together with certification that each individual is performance-qualified as specified. The certification shall state the type of welding and positions for which each is qualified, the code and procedure under which each is qualified, date qualified, and the firm and individual certifying the qualification tests.

1.6.2.2 Identification

Each particular weld shall be identified with the personal number, letter, or symbol assigned to each welder or welding operator. To identify welds, written records indicating the location of welds made by each welder or welding operator shall be submitted, and each welder or welding operator shall apply the personal mark adjacent to the welds using a rubber stamp or felt-tipped marker with permanent, weatherproof ink or other methods approved by the Contracting Officer that do not deform the metal. For seam welds, identification marks shall be placed adjacent to the welds at 3 foot intervals. Identification by die stamps or electric etchers will not be allowed.

1.6.2.3 Renewal of Qualification

Requalification of a welder or welding operator shall be required under any of the following conditions:

- a. When a welder or welding operator has not used the specific welding process for a period of 3 months; the period may be extended to 6 months if the welder or welding operator has been employed on some other welding process.
- b. When a welder or welding operator has not welded with any process during a period of 3 months, all the personal qualifications shall be considered expired, including any extended by virtue of a., above.
- c. There is specific reason to question the person's ability to make welds that will meet the requirements of the specifications.

1.6.3 Inspection and NDE Personnel

All inspection and NDE personnel shall be qualified in accordance with the following requirements.

1.6.3.1 Inspector Certification

Welding inspectors shall be qualified in accordance with AWS QC1.

1.6.3.2 NDE Personnel

NDE personnel shall be certified, and a written procedure for the control and administration of NDE personnel training, examination, and certification shall be established. The procedures shall be based on appropriate specific and general guidelines of training and experience recommended by ASNT RP SNT-TC-1A, ASNT RP SNT-TC-1A Bk B.

1.7 DELIVERY, STORAGE, AND HANDLING

All filler metals, electrodes, fluxes, and other welding materials shall be delivered to the site in manufacturers' original packages and stored in a dry space until used. Packages shall be properly labeled and designed to give maximum protection from moisture and to insure safe handling.

1.7.1 Material Control

Materials shall be stored in a controlled access and clean, dry area that is weathertight and is maintained at a temperature recommended by the manufacturer. The materials shall not be in contact with the floor and shall be stored on wooden pallets or cribbing.

1.7.1.1 Damaged Containers

Low-hydrogen steel electrodes shall be stored in their sealed shipping container. If the seal is damaged during shipment or storage, and the damage is not immediately detected, the covered electrodes in that container shall be rebaked in accordance with the manufacturer's instructions prior to issuance or shall be discarded. If a container is damaged in storage and the damage is witnessed, the electrodes from that container shall be immediately placed in a storage oven. The storage oven

temperature shall be as recommended by the manufacturer or the welding material specification.

1.7.1.2 Partial Issues

When a container of covered electrodes is opened and only a portion of the content is issued, the remaining portion shall, within 1/2 hour, be placed in a storage oven.

1.7.2 Damaged Materials

Materials which are damaged shall be discarded. Covered electrodes which are oil or water-soaked, dirty, or on which the flux has separated from the wire shall be discarded.

1.8 SYMBOLS

Symbols shall be in accordance with AWS A2.4.

1.9 SAFETY

Safety precautions shall conform to AWS Z49.1.

PART 2 PRODUCTS

2.1 WELDING MATERIALS

Welding materials shall comply with ASME BPVC SEC II-C. Welding equipment, electrodes, welding wire, and fluxes shall be capable of producing satisfactory welds when used by a qualified welder or welding operator using qualified welding procedures.

PART 3 EXECUTION

3.1 WELDING OPERATIONS

All welding performed under this specification shall be performed using the Tungsten Inert Gas (GTAW) process in accordance with qualified procedures using qualified welders and welding operators. Welding shall not be done when the quality of the completed weld could be impaired by the prevailing working or weather conditions. The Contracting Officer shall determine when weather or working conditions are unsuitable for welding.

3.1.1 Base Metal Preparation

Oxy-fuel cutting shall not be used on austenitic stainless steel or nonferrous materials.

3.1.2 Weld Joint Fit-Up

Parts that are to be joined by welding shall be fitted, aligned, and retained in position during the welding operation by the use of bars, jacks, clamps, or other mechanical fixtures. Welded temporary attachments shall not be used except when it is impractical to use mechanical fixtures.

When temporary attachments are used, they shall be the same material as the base metal, and shall be completely removed by grinding or thermal cutting after the welding operation is completed. If thermal cutting is used, the attachment shall be cut to not less than 1/4 inch from the member and the balance removed by grinding. After the temporary attachment has

been removed, the area shall be visually examined.

3.1.3 Preheat and Interpass Temperatures

Preheat temperatures shall meet the requirements specified by AWS D1.1/D1.1M AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1. However, in no case shall the preheat be below 50 degrees F for ferritic steel or austenitic stainless steel, or 32 degrees F for nonferrous alloys. The maximum interpass temperatures shall not exceed 300 degrees F for austenitic stainless steels, nickel alloys, and copper alloys; and 500 degrees F for carbon steels. Preheat techniques shall be such as to ensure that the full thickness of the weld joint preparation and/or adjacent base material, at least 3 inches in all directions, is at the specified temperature. Preheating by induction or resistance methods is preferred. When flame heating is used, only a neutral flame shall be employed. Oxy-fuel heating shall not be used on austenitic stainless steel or nickel-alloy materials; however, air-fuel heating is acceptable if controlled to insure that the surface temperature does not exceed 150 degrees F. Interpass temperatures shall be checked on the surface of the component within 1 inch of the weld groove and at the starting location of the next weld pass, and for a distance of about 6 inches ahead of the weld, but not on the area to be welded.

3.1.4 Production Welding Instructions

- a. Welding shall not be done when the ambient temperature is lower than 0 degree F.
- b. Welding is not permitted on surfaces that are wet or covered with ice, when snow or rain is falling on the surfaces to be welded, or during periods of high winds, unless the welders and the work are properly protected.
- c. Gases for purging and shielding shall be welding grade and shall have a dew point of minus 40 degrees F or lower.
- d. Back purges are required for austenitic stainless steels and nonferrous alloys welded from one side and shall be set up such that the flow of gas from the inlet to the outlet orifice passes across the area to be welded. The oxygen content of the gas exiting from the purge vent shall be less than 2 percent prior to welding.
- e. The purge on groove welds shall be maintained for at least three layers or 3/16 inch.
- f. Removable purge dam materials shall be made of expandable or flexible plugs, such as plexiglass, plywood (which shall be dry when used), etc. Wood dams shall be kiln-dried quality. Nonremovable purge dams and purge dam adhesives shall be made of water soluble materials. Purge dams shall not be made of polyvinyl alcohol.
- g. Any welding process which requires the use of external gas shielding shall not be done in a draft or wind unless the weld area is protected by a shelter. This shelter shall be of material and shape appropriate to reduce wind velocity in the vicinity of the weld to a maximum of 5 mph (440 fpm).

- h. Welding of low-alloy and hardenable high-alloy steels may be interrupted provided a minimum of at least 3/8 inch thickness of weld deposit or 25 percent of the weld groove is filled, whichever is greater, and the preheat temperature is maintained during the time that welding is interrupted. If the temperature falls below the minimum preheat temperature before all welding has been completed on a joint, or, where required, before post weld heat treatment, a liquid penetrant or magnetic particle examination shall be performed to insure sound deposited metal before reheating. Welding of other materials may be interrupted without restriction provided a visual inspection is performed before welding is resumed.
- i. Tack welds to be incorporated in the final welds shall have their ends tapered by grinding or welding technique. Tack welds that are cracked or defective shall be removed and the groove shall be retacked prior to welding. Temporary tack welds shall be removed, the surface ground smooth, and visually inspected. For low-alloy and hardenable high-alloy steels, the area shall be magnetic particle examination inspected.
- j. When joining ferritic steel pressure piping components to austenitic stainless steel pressure piping components and postweld heat treatment is required, the following requirements apply:
 - (1) The weld-end preps of ferritic steel components, which are to be welded to austenitic stainless steel, shall be buttered with one of the following weld filler metals and shall conform to the specified requirements:

ASME BPVC SEC II-C, SFA 5.14, Classification ERNiCr-3.

ASME BPVC SEC II-C, SFA 5.11, Classification ENiCrFe-2.
 - (2) The ferritic steel weld-end prep shall be buttered, receive a postweld heat treatment as required by AWS D1.1/D1.1M and then be machined with the applicable weld-end preparation. After machining, the buttered layer shall be a minimum of 1/4 inch thick.
 - (3) Pressure piping transition joints shall be completed using ERNiCr-3 or ENiCrFe-2 weld filler metals. No further postweld heat treatment shall be performed.
- k. When joining ferritic steel pressure piping components to austenitic stainless steel pressure piping components and postweld heat treatment is not required, prepare and weld the joint using either ERNiCr-3 or ENiCrFe-2 filler metals. For service temperatures of 200 degrees F or less, stainless filler metal 309 ASME BPVC SEC II-C, SFA 5.4 or 5.9 is permissible in lieu of the nickel-based alloys.
- l. Grinding of completed welds is to be performed only to the extent required for NDE, including any inservice examination, and to provide weld reinforcement within the requirements of AWS D1.1/D1.1M AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1. If the surface of the weld requires grinding, reducing the weld or base material below the minimum required thickness shall be avoided. Minimum weld external reinforcement shall be flush between external surfaces.

3.1.5 Postweld Heat Treatment

Postweld heat treatment shall be performed in accordance with AWS D1.1/D1.1M AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1. Temperatures for local postweld heat treatment shall be measured continuously by thermocouples in contact with the weldment.

Postweld heat treatment of low-alloy steels, when required, shall be performed immediately upon completion of welding and prior to the temperature of the weld falling below the preheat temperature. However, postweld heat treatment may be postponed after the completion of the weld, if, immediately after the weld is completed, it is maintained at a minimum temperature of 300 degrees F or the preheat temperature, whichever is greater, for 2 hours per inch of weld thickness.

For low-alloy steels, the cooling rates shall be such that temper embrittlement is avoided.

3.2 EXAMINATIONS, INSPECTIONS, AND TESTS

Visual and NDE shall be performed by the Contractor to detect surface and internal discontinuities in completed welds. The services of a qualified commercial inspection or testing laboratory or technical consultant, approved by the Contracting Officer, shall be employed by the Contractor. All tack welds, weld passes, and completed welds shall be visually inspected. In addition, liquid penetrant examination shall be performed on root passes. Radiographic, Liquid penetrant, Magnetic particle, or Ultrasonic examination shall be required as indicated in TABLE I. When inspection and testing indicates defects in a weld joint, the weld shall be repaired by a qualified welder in accordance with paragraph CORRECTIONS AND REPAIRS.

TABLE I. MANDATORY MINIMUM NONDESTRUCTIVE EXAMINATIONS

Type Weld	Piping Service Conditions and Nondestructive Test		
	Temperatures over 750 degrees F and at all pressures.	Temperatures between 350 degrees F and 750 degrees F inclusive and at pressures above 1,025 psig.	All others.
Butt Welds (Girth and Longitudinal)	RT for NPS over 2 inch MT or PT for NPS 2 inches and less.	RT for over 2 inch NPS with thickness over 3/4 inch. Visual for all sizes with thickness 3/4 inch or less.	Visual for all sizes and thicknesses.
Welded Branch Connections (Size indicated is branch size)	RT for NPS over 4 inch MT or PT for NPS 4 inches and less.	RT for branch over 4 inch NPS and thickness of branch over 3/4	Visual for all sizes and thicknesses.

TABLE I. MANDATORY MINIMUM NONDESTRUCTIVE EXAMINATIONS

Type Weld (See Note 7)	Piping Service Conditions and Nondestructive Test		
		inch. Visual for all sizes with branch thickness 3/4 inch or less.	
Fillet, Socket Attachment and Seal Welds	PT or MT for all sizes and thicknesses.	Visual for all sizes and thicknesses.	Visual for all sizes and thicknesses.

NOTES TO TABLE I

- (1) All welds must be given a visual examination in addition to type of specific nondestructive examination specified.
- (2) NPS - nominal pipe size.
- (3) RT - Radiographic examination; MT - magnetic particle examination; PT - liquid penetrant examination.
- (4) RT of branch welds shall be performed before any nonintegral reinforcing material is applied.
- (5) The thickness of butt welds is defined as the thicker of the two abutting ends after end preparation.
- (6) Temperatures and pressures shown are design.
- (7) In lieu of radiography of welded branch connections when required above, liquid penetrant or magnetic particle examination is acceptable and, when used, shall be performed at the lesser of one half of the weld thickness or each 1/2 inch of weld thickness and all accessible final weld surfaces.
- (8) For nondestructive examination of the pressure retaining component, refer to the standards listed in applicable code or the manufacturing specifications.
- (9) Fillet welds not exceeding 1/4 inch throat thickness which are used for the permanent attachment of nonpressure retaining parts are exempt from the PT or MT requirements of the above table.

3.2.1 Random NDE Testing

In addition to the mandatory minimum nondestructive examinations required in para. 3.2 Table I, additional random radiographic magnetic particle, liquid dye penetrant, or ultrasonic examination is required. the Contractor shall test a minimum of 5 percent of the total length or number of piping welds for each welder. NDE testing includes both external and internal (where accessible) faces. The welds inspected shall be selected randomly, but the selection shall include as a minimum, an examination of 5 percent of welds made by each welding operator or welder. If the random testing reveals that any welds fail to meet minimum quality requirements, an additional 5 percent of the welds in that same group shall be inspected.

If all of the additional welds inspected meet the quality requirements, the entire group of welds represented shall be accepted and the defective welds shall be repaired. If any of the additional welds inspected also fail to meet the quality requirements, that entire group of welds shall be rejected. The rejected welds shall be removed and rewelded, or the rejected welds shall be 100 percent inspected and all defective weld areas removed and rewelded.

3.2.2 Visual Inspection

Weld joints shall be inspected visually as follows:

- a. Before welding - for compliance with requirements for joint preparation, placement of backing rings or consumable inserts, alignment and fit-up, and cleanliness.
- b. During welding - for cracks and conformance to the qualified welding procedure.
- c. After welding - for cracks, contour and finish, bead reinforcement, undercutting, overlap, and size of fillet welds.

3.2.3 NDE Testing

NDE shall be in accordance with written procedures. Procedures for radiographic magnetic particle, liquid dye penetrant, or ultrasonic tests and methods shall conform to ASME BPVC SEC V. The approved procedure shall be demonstrated to the satisfaction of the Contracting Officer. In addition to the information required in ASME BPVC SEC V, the written procedures shall include the timing of the NDE in relation to the welding operations and safety precautions.

3.2.4 Hydrostatic Testing

Hydrostatic testing of all piping shall be included with the requirements for testing the stainless steel process tank and be tested as a complete system including the tank and all associated piping. Hydrostatic testing shall comply with the requirements of section 13206 para. 3.3.2.2

3.2.5 Inspection and Tests by the Government

The Government will perform inspection and supplemental nondestructive or destructive tests as deemed necessary. The cost of supplemental NDE will be borne by the Government. The correction and repair of defects and the reexamination of weld repairs shall be performed by the Contractor at no additional cost to the Government. Inspection and tests will be performed as required for visual inspection and NDE, except that destructive tests may be required also. When destructive tests are ordered by the Contracting Officer and performed by the Contractor and the specimens or other supplemental examinations indicate that the materials and workmanship do not conform to the contract requirements, the cost of the tests, corrections, and repairs shall be borne by the Contractor. When the specimens or other supplemental examinations of destructive tests indicate that materials or workmanship do conform to the specification requirements, the cost of the tests and repairs will be borne by the Government. When destructive tests are made, repairs shall be made by qualified welders or welding operators using welding procedures which will develop the full strength of the members cut. Welding shall be subject to inspection and tests in the mill, shop, and field. When materials or workmanship do not

conform to the specification requirements, the work may be rejected at any time before final acceptance of the system containing the weldment.

3.3 ACCEPTANCE STANDARDS

3.3.1 Visual

The following indications are unacceptable:

- a. Cracks.
- b. Undercut on surface which is greater than 1/32 inch deep.
- c. Weld reinforcement greater than 3/16 inch.
- d. Lack of fusion on surface.
- e. Incomplete penetration (applies only when inside surface is readily accessible).
- f. Convexity of fillet weld surface greater than 10 percent of longest leg plus 0.03 inch.
- g. Concavity in groove welds.
- h. Concavity in fillet welds greater than 1/16 inch.
- i. Fillet weld size less than indicated or greater than 1-1/4 times the minimum indicated fillet leg length.
- j. Pinholes
- k. Evidence of peening or blasting
- l. Oxidation around welds
- m. Welds not uniform in appearance
- n. Presence of porosity, slag inclusion or overlaps
- o. Excessive weld penetration (internal protrusion or reinforcement)
- p. Misalignment exceeding allowable limits
- q. Leaks detected during hydrostatic tests

3.3.2 Magnetic Particle Examination

The following relevant indications are unacceptable:

- a. Any cracks and linear indications.
- b. Rounded indications with dimensions greater than 3/16 inch.
- c. Four or more rounded indications in a line separated by 1/16 inch or less edge-to-edge.
- d. Ten or more rounded indications in any 6 square inches of surface with the major dimension of this area not to exceed 6 inches with

the area taken in the most unfavorable location relative to the indications being evaluated.

3.3.3 Liquid Penetrant Examination

Indications with major dimensions greater than 1/16 of an inch shall be considered relevant. The following relevant indications are unacceptable:

- a. Any cracks or linear indications.
- b. Rounded indications with dimensions greater than 3/16 inch.
- c. Four or more rounded indications in a line separated by 1/16 inch or less edge-to-edge.
- d. Ten or more rounded indications in any 6 square inches of surface with the major dimension of this area not to exceed 6 inches with the area taken in the most unfavorable location relative to the indications being evaluated.

3.3.4 Radiography

Welds that are shown by radiography to have any of the following discontinuities are unacceptable:

- a. Porosity in excess of that shown as acceptable in ASME BPVC SEC I, Appendix A-250.
- b. Any type of crack or zone of incomplete fusion or penetration.
- c. Any other elongated indication which has a length greater than:
 - (1) 1/4 inch for t up to 3/4 inch inclusive, where t is the thickness of the thinner portion of the weld.
 - (2) 1/3 t for t from 3/4 inch to 2-1/4 inch, inclusive.
 - (3) 3/4 inch for t over 2-1/4 inch.
- d. Any group of indications in line that have an aggregate length greater than t in a length of 12t, except where the distance between the successive indications exceeds 6L where L is the longest indication in the group.

Where t pertains to the thickness of the weld being examined; if a weld joins two members having different thickness at the weld, t is the thinner of these two thicknesses.

3.3.5 Ultrasonic Examination

Linear-type discontinuities are unacceptable if the amplitude exceeds the reference level and discontinuities have lengths which exceed the following:

- a. 1/4 inch for t up to 3/4 inch.
- b. 1/3 inch for t from 3/4 to 2-1/4 inch.
- c. 3/4 inch for t over 2-1/4 inch.

Where t is the thickness of the weld being examined; if the weld joins two members having different thicknesses at the weld, t is the thinner of these two thicknesses. Where discontinuities are interpreted to be cracks, lack of fusion, and incomplete penetration, they are unacceptable regardless of length.

3.4 CORRECTIONS AND REPAIRS

Defects shall be removed and repaired as specified in AWS D1.1/D1.1M, AWS D1.6, AWS D10.4, AWS D10.8, and AWS D18.1 unless otherwise specified. Disqualifying defects discovered between weld passes shall be repaired before additional weld material is deposited. Wherever a defect is removed, and repair by welding is not required, the affected area shall be blended into the surrounding surface eliminating sharp notches, crevices, or corners. After defect removal is complete and before rewelding, the area shall be examined by the same test method which first revealed the defect to ensure that the defect has been eliminated. After rewelding, the repaired area shall be reexamined by the same test method originally used for that area. Any indication of a defect shall be regarded as a defect unless reevaluation by NDE or by surface conditioning shows that no disqualifying defects are present. The use of any foreign material to mask, fill in, seal, or disguise welding defects will not be permitted.

-- End of Section --